

### Abstract of the Disclosure

A method of forming an  $H_2$  passivation layer in an FeRAM includes preparing a silicon substrate; depositing a layer of  $TiO_x$  thin film, where  $0 < x < 2$ , on a damascene structure; plasma space etching of the Ti or  $TiO_x$  thin film to form a  $TiO_x$  sidewall; annealing the  $TiO_x$  side wall thin film to form a  $TiO_2$  thin film; depositing a layer of ferroelectric material; and metallizing the structure to form a FeRAM.